

CLAIMS

1. An agent for digesting a protein highly resistant to denaturation and degradation, comprising as an active ingredient an enzyme exhibiting an activity of digesting a protein highly resistant to denaturation and degradation and having the following properties:

(a) activity and substrate specificity: hydrolyzing a peptide bond of a protein highly resistant to denaturation and degradation;

(b) molecular weight: 31,000 (determined by an SDS-polyacrylamide gel electrophoresis using a homogeneous gel having a gel concentration of 12%);

(c) isoelectric point: pI 9.3 (determined by polyacrylamide gel isoelectric focusing electrophoresis);

(d) optimum pH: pH 9.0 to 10.0; and

(e) optimum temperature for activity: 60 to 70°C.

2. The agent according to claim 1, wherein the enzyme has the following property:

(g) exhibiting an activity of 2 U/g or more as the activity of digesting a protein highly resistant to denaturation and degradation (determined as an activity of digesting keratin azure.

3. The agent according to claim 1 or 2, wherein the enzyme has the following property:

(h) derived from a microorganism belonging to genus *Bacillus*.

4. An agent for digesting a protein highly resistant to denaturation and degradation, comprising as an active ingredient an enzyme selected from the group consisting of  
(X) an enzyme comprising the amino acid sequence of SEQ ID NO: 2;

(Y) a modified enzyme exhibiting an activity of digesting a protein highly resistant to denaturation and degradation, and comprising an amino acid sequence in which one or plural amino acids are deleted, substituted, or added in the amino acid sequence of SEQ ID NO: 2; and

(Z) a homologous enzyme exhibiting an activity of digesting a protein highly resistant to denaturation and degradation,

and comprising an amino acid sequence having an 85% or more homology with the amino acid sequence of SEQ ID NO: 2.

5. The agent according to any one of claims 1 to 4, wherein the protein highly resistant to denaturation and degradation is a pathogenic prion protein.

6. A method for digesting a protein highly resistant to denaturation and degradation, comprising the step of bringing the protein highly resistant to denaturation and degradation into contact with the agent or enzyme according to any one of claims 1 to 5.

7. Use of the enzyme according to any one of claims 1 to 5, in the manufacture of an agent for digesting a protein highly resistant to denaturation and degradation.

8. An agent for detoxifying a pathogenic prion protein in a subject which may be contaminated with a pathogenic prion protein, comprising as an active ingredient the enzyme according to claims 1 to 5.

9. A method for detoxifying a pathogenic prion protein, comprising the step of bringing a subject which may be contaminated with a pathogenic prion protein into contact with the enzyme according to any one of claims 1 to 5 or the agent according to claim 8.

10. A method for detoxifying a pathogenic prion protein, comprising the step of bringing a subject which may be contaminated with a pathogenic prion protein into contact with the enzyme according to any one of claims 1 to 5 or the agent according to claim 8, without preheating the subject.

11. A method for detoxifying a pathogenic prion protein, comprising the step of bringing a subject which may be contaminated with a pathogenic prion protein into contact with the enzyme according to any one of claims 1 to 5 or the agent according to claim 8, without preheating the subject at 90°C or more.

12. Use of the enzyme according to any one of claims 1 to 5, in the manufacture of an agent for detoxifying a pathogenic prion protein.